

Accelerator Systems Division Highlights Ending March 4, 2005

ASD/JLAB: Cold Linac

The H-12 cryomodule will be shipped to ORNL March 9.

H-2 cryomodule assembly is complete. It will go to ORNL March 16.

SNS CRYOMODULE FABRICATION IS COMPLETE!

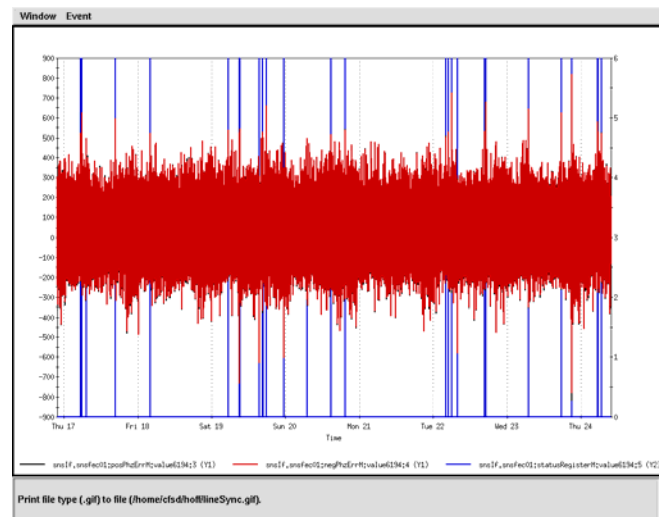
ASD/BNL: Ring.

Controls

Operations were transferred to the CLO Control Room on the milestone date of February 28. The PPS consoles and the northwest controls console arc are complete (except for paneling and special fixtures) and fully loaded with OPIs and screens. Temporary consoles continue to be used in the southern console arc. All OPIs have been updated and patched with the latest OS and security. The move of the PPS and ODH system equipment from the front end control room to the new CLO central control room was completed this week with the certification of the PPS.

Security and remote access issues were addressed for Windows-based computers in the control room and elsewhere on the controls network. "Rdesktop" (a UNIX remote desktop program) works VERY well to connect to windows machines. No windows domain controller or special authentication consideration is required.

The VME-based line-sync system development is complete at BNL. Components are being readied for shipping to ORNL. Below is a graph showing the results of one week of testing using "live" input (from the Long Island Power Authority). The red (and black) traces show the accumulated "time error" caused by variations in line frequency (limited by constraints due to the neutron choppers). The vertical blue bars show each time the 500 usec maximum time limitation was exceeded. Although these tests should be repeated at ORNL, the results should be similar, and therefore can be used as a basis for predicting system operational behavior.



The ORNL-developed event link monitor is now being used to do detailed analysis and check out of the timing system.

Archiver data has been moved to provide space needed for the upcoming SCL run. Engines are running and ready for new data. A new server is online. Some archived data needed repair after an unexpected power outage caused some data damage.

The controls team supported the successful operation of the 2K cold box with fully automated procedures. The visiting expert from JLab suggested that that level of automation had not been achieved at JLab for three years.

The controls team continues to support the installation of the SCL, bringing up vacuum, cryogenic and RF systems for commissioning as they are ready. At week's end all subsystems needed to resume cryomodule processing of the first high beta modules were declared ready. SCL_HPRF:IOC15 is communicating with all of its components (that is: SCL_HPRF:Mod15, SCL_HPRF:Xmtr15, SCL_HPRF:Xmtr17 as well as the coupler cooling, timing, and utility modules.)

The Target Building communications cable design was checked and an SRO was submitted. Support was given to start target control room operations. The current version of all CF and Target screens were moved from the "Tullahoma" server to the controls ics-srv02. Power monitoring files for the Cutler-Hammer workstation in the CUB were backed up. Friendlier Alarm Handler files for conventional facilities parameters have been prepared and are ready to demonstrate.

The RF test facility was updated to the new HPM board & kernel levels. Some problems with the serial driver remain. There was continued progress on the LEBT/MEBT Chopper Controller design.

Several improvements have been implemented in the SCL HPRF PLCs. The SCL PLC program now forces the magnets on when the filaments are on, time synchronization with EPICS and remote control of the RF sampling time delay has also been added. Protection against magnet overheating (due to low cooling flow) was added during modes which previously did not have the magnets energized. Displayed units for high reflected power have been changed from dBm to kilowatts and a conversion constant for RF attenuation between the waveguide and the RF detectors has been added. Panel View changes were made to allow an operator to input the required additional calibration information. These changes have been made to the SCL7 panel and tested.

Installation

Craft Snapshot 3/1/05

ASD productive craft workers	70.0
Foremen (Pd by 15% OH)	6.0
AMSI management (Pd directly)	3.0
TOTAL AMSI WORKERS	79.0
Less WBS 1.9, 1.2 etc	8.0
Less absent	4.0
TOTAL PD BY ASD/ORNL DB WPs	58.0

Accelerator Physics

The SCL online model is complete for both the longitudinal and transverse dynamics. Alternative linac lattices tuned for lower peak current (useful for first commissioning) are being developed.

Energy Degradation/Faraday Cup commissioning data is being analyzed by D. Jeon to extract bunch length information in the warm linac. Preliminary results from BSM measurements in the CCL show bunch lengths longer than expected.

Y. Zhang has completed an analysis of the SC induced signals from drifting beam. His results agree with earlier work by Lloyd Young.

Good progress has been made over the last few weeks on the ring physics applications needed for HEBT/Ring/RTBT commissioning and operation. We now have prototype applications for closed orbit correction, injected beam position and angle measured two different ways, and betatron tune measurement.

SNS/AP tech note #139 has been released. This note discusses beam injection into the ring without injection kickers. The url is <http://it.sns.ornl.gov/asd/public/pdf/sns0139/sns0139.pdf>

Operations

Control room move to the CLO:

The SNS Central Control Room (CCR) changed location from the Front End Building to the CLO following the transfer of the ODH system.

The phone numbers remain the same, i.e. 576-1502, 576-1503 and 576-7671. There is also a cell phone for the CCR, 387-1190.

The CCR will be manned 24 hours per day by the Chief Operator. Please continue to coordinate and inform the CCR of any significant events, e.g. power outages, equipment testing and problems, alarms, safety issues, access restrictions or requirements (e.g. visitor prox cards) etc.

The Front End building temporarily has the same phone numbers as the CLO CCR, but new numbers will be installed at the Front End Building soon. In the meantime, if the phone rings in the Front End, do not answer it, as it is probably intended for the CCR, and please do not tie up those lines unnecessarily.

PPS Certification:

The PPS version 1.3 was certified. This new version includes the Front End and the entire Linac to the HEBT gate.

RGD:

The RGD committee granted certification of the new PPS version 1.3 as an ORNL RGD.

SCL Handover:

Portions of High Beta modules 2-6 were handed over to Operations for RF processing.

Ion Source

Syd Murray successfully started up the Pfeiffer leak detector that we received from LANL. This will expedite the checkout and startup of the Ion Source Hot Spare Stand. In addition, it guarantees that there is always one leak detector in the front end building to expedite the recovery from ion source failures.

Allen Justice succeeded in controlling the Cesium collar temperature using the feedback from a thermo couple. The improved control is very important for running at high power and duty cycle where the collar is heated and or cooled simultaneously by the plasma and the external air.

Martin Stockli gave the Physics Department colloquium at Auburn University in Alabama. The department has a very interesting and active research program, but is often in the shadow of its more famous football program. The colloquium was received with high interest by the ~50 attending faculty and students

Survey and Alignment

In the SCL area, Survey & Alignment completed alignment of cryo-module HB 07 and set the cryo-module stands for HB 01 and 02. Two additional warm sections were also aligned. Additionally, in the Magnet Measurement area, two additional warm sections were pre-aligned. Barring and unforeseen difficulties, by COB Friday we will have also completed alignment of cryo-module HB 08 aligned. Bolt hole layouts were also completed for two dummy cryo-modules.

See attached alignment status PDF for SCL Area-à <<S_A_SCL_Update_04_March_05.pdf>>

S & A completed calculations and actual layout of 58 bolt holes for the Ring Extraction Kicker area.

BY COB Friday, we will have completed Arc A network measuring campaign. As a result of floor settlement, etc. future alignment in the HEBT/Ring/RTBT will require repair of the degraded S & A Global Survey Network. Furthermore as a result of insufficient manpower, we will not be able to conduct a full blown network re-observation

campaign. Therefore, the HEBT/Ring/RTBT will be divided into six quadrants, each requiring about three days of measuring prior to performing alignment on any components. This method, will allow for us to align components in each quadrant to a high degree of accuracy (± 100 microns relative to each localized quadrant, not globally).

Data analysis is continuing on a number of areas including Ring Injection, and the comparison of new soon to be released global coordinates with exiting lattice coordinates.

S&A aligned the core vessel insert fixture inside the alignment hut of the Target Building. This will be used to align ET the guide in the core vessel insert of instrument line #2.

We marked out the majority of the instrument bisector lines along with the core vessel flange perpendicularity line in the target building. These lines will be used to design the stacked shielding along with the building of concrete forms.

.Mechanical

One more warm section is ready to install (HB21) and we are assembling MB01 and MB02 warm sections.

We also completed mapping a fourth RTBT 21Q40.

Ring Systems Installation

- The first HEBT Collimator remote clamp assembly prototype was installed for fit and function checkout.
- The Ring Injection straight section Downstream Short Kicker magnet was installed.
- The Ring Extraction straight section Kicker Magnet #1 was received and staged for installation.
- The Ring Extraction straight section lattice mounting holes were surveyed and drilled.
- The Ring RF straight section IPM Diagnostic Chambers (2) were received and staged for installation.
- The forms were removed from all the straight section magnet support stands that were grouted.

Water Systems Installation

- Installation of the Linac SCL Cryo Warm Section cooling connections continued.
- Installation of the Linac SCL PS rack cooling systems continued.
- Installation of the Linac SCL ME07 HVCM and SCR cooling systems was started.
- Installation of the HEBT Collimator closed loop cooling system continued.
- Installation of the Ring SB PFN cooling system manifolds continued.
- Installation of the Ring tunnel arc magnet cooling connections continued.
- Installation of the RTBT Service Building PS cooling system was started.

Electrical Group

Linac Tunnel:

Completed cable terminations for SCL modules HB-8. Working on cable terminations for SCL modules HB-9, HB-10, and MB-2 and warm section terminations.

Linac Klystron Gallery:

SCL ME-6 area – cable terminations in progress

SCL ME-7 area – cable pulling, ac power installation, cable terminations in progress

SCL ME-8 area – ac power terminations, diagnostics and vacuum terminations in progress

Ring Building:

AC power terminations for RF systems, PPS wiring, and rack installation in progress. Installing racks and trays in kicker power supply area. Cable tray installation in PFN building.

RTBT:

AC power and cable tray installation ongoing in the RTBT building.

Power Supplies:

Completed integrated magnet/power supply/controls testing for SCL warm sections 16 (HB-5), 24 and 25, bringing the completed warm section integrated magnet/power supply/controls tests to 16 of 34. SCL warm section 16 (HB-5) integrated magnet/power supply/controls testing started this week.

Completed integrated magnet/power supply/controls testing for HEBT power supply LDmp_MAG:PS_QV04. This brings the number of completed HEBT integrated magnet/power supply/controls tests to 13 of 22.

Modulators/Pulsed Power:

SCL ME6 integrated test/checkout complete.

SCL ME7 installation in progress, modulator and tank in place.

HPRF

.

LLRF

Installation: The power-coupler fiber-optic arc detection and test system for SCL ME-4 is complete and ready to support ME-4 cryomodule testing. Checkout of the SCL ME-5 LLRF systems is complete (rack AC power was turned on Tuesday); these systems are ready to support HPRF testing of ME-5. Most of the SCL ME-6 heliax cables have been terminated and connected. The first six LLRF stations of ME-6 have AC power and those stations are online. Cable pulls are in progress on SCL ME-7. The LLRF racks are installed and partially populated. All but the last five FCMs and HPMs are installed (91 systems to date). Electricians are working on the 805 MHz reference line in the tunnel. If they continue this effort, then the reference system will be finished well in advance of the SCL readiness review.

Inventory: We completed an inventory of the FCMs and HPMs and passed the information on to George Dodson.

Procurements: The intra-rack coaxial cables needed to complete the linac were received. Additional RF Output daughter boards are due next week.

Code Development: Hengjie and Larry have been working together on the checkout of Larry's new FPGA code for the FCM with support from Kay. Several issues are under investigation, including problems with the Xilinx XST synthesis tools compared to the Synplicity tools.

Ring RF: The ring LLRF hardware was received from BNL. Electricians are working for us in the Ring service building, and there is much progress on the setup of the control room and the HPRF equipment. The Controls group has been working together to setup the necessary software for operation of the LLRF software tools developed at BNL.

Cryo Group

Cryogenic System Commissioning Completed

2K system commissioned

Resume 4K operation

HB6 cooling down today

Beam Diagnostics

BPM:

- MB03-MB11 and HEBT installed and connected in the tunnel
- HB06-HB21 awaiting pull and DB termination of cables

- Installed HB01-HB04 in tunnel, Cable to be dressed by DB
- BPM05, 06, 07, 08, 09, and 10 (SCL row 15 rack 1) phase match complete.
- Discovered 3 open connections on a HEBT BPM and repaired them. Further investigation is underway to determine if there is a more widespread problem with these contacts.
- The timing card was successfully tested with the linac BPM electronics.
- Ring BPM electronics: Added PVs, remote/local logic, and config. Sent code to BNL

BLM:

- Ion Chambers received and calibration in process
- MB03-HB3 and HEBT cables installed
- MB03-HB3 and HEBT mounting brackets installed
- HB4-HB21 long haul cable pulls in progress
- BLM calibration stand: validating measurements (finding right setup params)

Wire scanners

- WS: parts for test (400ft, motor with NI drive) being ordered

Laser systems

- LW01 and LW02 have been wired and tested and are ready for installation on warm sections MB01 and MB02
- MB03 (LW03) and MB04 (LW04) are installed and have been function tested through the long haul cables
- HB01 (LW12) through HB04 (LW15) tunnel connected in tunnel
- HB21 (LW32) long haul cable termination in process nearing completion in tunnel
- W32 terminations in progress complete in HEBT row 1 rack 9
- The timing card was successfully tested in a laser PC based IOC.
- Video Profile Monitor for laser: Igor is adding code to Template
- Quad detector test system has been set up with a 6014

Harp

- CompactRIO successfully tested with one valve. This completes the first step in integrating the target harp motion control.

Timing/Reference

- IES has begun setting up for the timing card run. We expect about 40 cards next week.
- Functional testing of the timing card was completed. All features perform as expected.
- Timing card test programs using lower library functions in progress
- RF Distribution chassis installed in SCL (6 each)
- RF Distribution chassis wired in SCL row 15
- An 8 channel optical amplifier was ordered for installation in the near the end of SCL. This will boost the signal levels sent to the rest of the linac style BPM electronics through the end of HEBT.

SCL Installation

- Racks complete through row 15 (8 of 20)
- Rack prep in progress for remaining 12 racks

HEBT Installation

- Rack prep complete in HEBT
HEBT cabling complete except LW32 and Laser Stripping experiment

Software

BLM IOC:

Ch0: Ordered multi-media boxes

Platform: Dynamic ctl replacement code received from NI, evaluating.

Wim will travel to BNL next week to work on Ring BPM and Video Foil software.

Configuration/PCs

DMZ Terminal Server Setup.

Remote Desktop Linux to Windows

Database work.

Continued with Manufacturer/Model breakdown for effort of web access to documentation.

Planned trips to ANL (IRMIS) and ManagedFusion.